

LD Series - 3" Tube Heater Installation, Operation, Maintenance and Parts Manual*

⚠ WARNING: This heater must be installed and serviced by trained gas installation and service personnel only! Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment. Protect yourself and others by observing all safety information. Retain instructions for future reference.

LD Series

* For complete installation instructions, see General IOM this piece was inserted within. Also available at www.reverberray.com.

Project:	_____	Date:	_____
Location:	_____		
City:	_____	State:	_____ Zip: _____
Customer Name:	_____		
Local Representative:	_____		
Contractor:	_____		
Engineer:	_____		
Address:	_____		
City:	_____	State:	_____ Zip: _____
Phone #:	_____	Serial #:	_____
Date of Installation:	_____		
Notes:	_____		

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Commercial Models (Approved for commercial use)

Qty.	Model #	Gas Type (circle one)	MBTU's	Length	U-Tube Length	Weight	Min. Mtg. Height	Combustion Chamber	Radiant Emitter Tube	"Type" Tube Pkg #1	"Type" Tube Pkg. #2	Baffle Pieces
	LD 10-40	N or LP	40 / 28	12'-3"	N/A	70#	10 ft.	Titanium Coated	N/A	10-3 Titanium	N/A	3
	LD 15-40	N or LP	40 / 28	17'-0"	N/A	85#	8 ft.	Titanium Coated	Aluminized	15-3 Titanium	N/A	3
	LD 15-50	N or LP	50 / 35	17'-0"	N/A	85#	10 ft.	Titanium Coated	Aluminized	15-3 Titanium	N/A	3
	LD 20-40	N or LP	40 / 28	22'-0"	13'-0"	100#	8 ft.	Titanium Coated	Aluminized	20-3 Titanium	N/A	3
	LD 20-50	N or LP	50 / 35	22'-0"	13'-0"	100#	9 ft.	Titanium Coated	Aluminized	20-3 Titanium	N/A	3
	LD 30-50	N or LP	50 / 35	31'-3"	*17'-8"	120#	9 ft.	Titanium Coated	Aluminized	30-3 Titanium	N/A	3

Residential Models (Approved for both commercial and residential use)

Qty.	Model #	Gas Type (circle one)	MBTU's	Length	U-Tube Length	Weight	Min. Mtg. Height	Combustion Chamber	Radiant Emitter Tube	"Type" Tube Pkg #1	"Type" Tube Pkg. #2	Baffle Pieces
	LD 15-40	N or LP	40 / 28	17'-0"	N/A	85#	8 ft.	Titanium Coated	Aluminized	15-3 Titanium	N/A	3
	LD 20-40	N or LP	40 / 28	22'-0"	13'-0"	100#	8 ft.	Titanium Coated	Aluminized	20-3 Titanium	N/A	3
	LD 30-50	N or LP	50 / 35	31'-3"	*17'-8"	120#	9 ft.	Titanium Coated	Aluminized	30-3 Titanium	N/A	3

* Model requires 5EA-Sub accessory package.

Warranty registration options:

1. Register online at www.reverberray.com/warranty.
2. Fill out this page and fax to Detroit Radiant Products Co.
3. Fill out this page and mail a copy to Detroit Radiant Products Co.



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21400 Hoover Rd., Warren, MI 48089
T. (586) 756-0950 F. (586) 756-2626
Form# LIOLD-1.5M-4/04 (MWG)
Replaces Form# LIOLD-2M-10/02



LD Series

Warnings & Clearances to Combustibles

⚠ WARNING!

NOT FOR RESIDENTIAL USE!

Do not use in the home, sleeping quarters, attached garages, etc.

⚠ WARNING!

This heater must be installed and serviced by trained gas installation and service personnel only. Read and understand these instructions thoroughly before attempting to install, operate or service this heater. Failure to comply could result in personal injury, asphyxiation, death, fire, and/or property damage. Retain these instructions for future reference.

⚠ WARNING!

This is not an explosion-proof heater. Where there is the possibility of exposure to flammable vapors, consult the local fire marshal, the fire insurance carrier and other authorities for approval of the proposed installation.

⚠ WARNING!

In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. Signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats in a conspicuous location.

⚠ WARNING!

Failure to comply with the stated clearances to combustibles could result in personal injury, death and/or property damage.

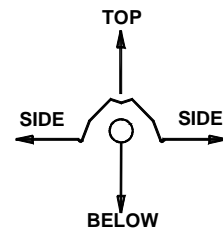
⚠ WARNING!

This heater should be installed so that the minimum clearances to vehicles, as marked on the heater, will be maintained. If vehicle lifts are present, ensure that these clearances will be maintained from the highest raised vehicle.

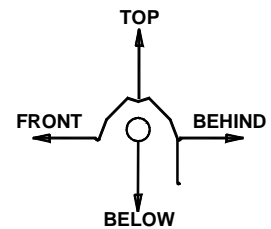
LD CLEARANCES TO COMBUSTIBLES (IN.)*

MODEL NO.	MOUNTING ANGLE	SIDE		TOP	BELOW
		FRONT	BEHIND		
LD (10,15,20) - 40	0°	15	15	6	45
	45°	58	8	10	45
	0°	42	8	6	45
	0°	20	20	6	45
	0°	NA	NA	NA	NA
LD 15 - 50	0°	11	11	6	48
	45°	39	8	10	48
	0°	29	8	6	48
	0°	16	16	6	48
	0°	NA	NA	NA	NA
LD (20,30) - 50	0°	11	11	6	48
	45°	39	8	10	48
	0°	29	8	6	48
	0°	16	16	6	48
	0°	7	7	6	30

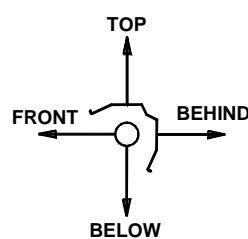
* See chart on page one for models certified for residential use.



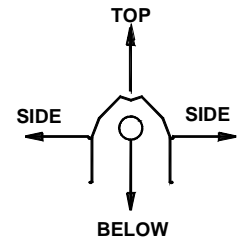
0° MOUNTING ANGLE



0° W/1 SIDE SHIELD



45° MOUNTING ANGLE



0° W/2 SIDE SHIELDS

LD Series Mechanical Instructions

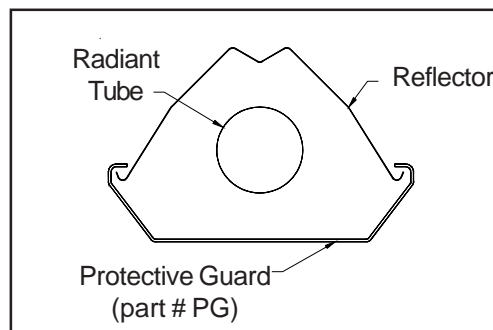
This supplement is designed to address the specifics of the LD Series - See page 12 for specific product features.

Specific Mechanical Instructions

Be sure to identify the titanium combustion chamber and place as the first tube section. **Do not** use the aluminized steel radiant tubing as the first tube (combustion chamber).

For residential installations it is **required** that the appliance is vented. Venting must be 3 in. diameter (4 in. diameter for common venting). Refer to the flue venting guidelines on page 19 of the General Manual.

If the heater is mounted below 8 feet, it is **required** that Protective Guards (part # PG) are installed on heater (see illustration at right).



Operational Features

LD Series heaters require a 24 Volt, two-stage thermostat to operate. Each heater has a round terminal strip (or yellow cord) that accepts three 1/4 in. insulated spade terminals for the thermostat wiring. Do not install 120V to the 24V connection. 120V connection is factory wired with a three prong pig tail.

There are two versions of the LD Series. The standard version comes without a relay board (HLRB) and the other is supplied with an internal relay board (HLRB) factory installed. A LD Series unit **without** a relay board (HLRB) supplies it's own control voltage and is identified by a round white band located around the spade terminal. If two or more LD models are to be controlled by a single thermostat, they must be factory assembled with optional relay boards (HLRB) and installed using an external transformer (field supplied) as shown on page 6. A LD Series unit **with** a relay board (HLRB) installed is identified by a round orange band around the spade terminal. On *stainless steel* heaters, units with a relay board (HLRB) will be labeled accordingly. All models assembled with a relay board (HLRB) reference the suffix "D" on the CSA rating plate.

LD BAFFLE INSTRUCTIONS

WITH TURBULATOR FINS

Insert assembled baffles with HEAT Baffle preceding the PRESSURE Baffles (fig. 1). Allow for turbulator fins so that the key hole is inserted first. All baffles must be placed vertically in the last radiant tube/heat exchanger (fig.2).

If the heater is installed with a U or Elbow fitting all baffle must still remain. There may be some instances where the baffle will be cut into two sections. Place as much baffle as possible downstream of the U or Elbow and the remainder of the baffle just before the U or Elbow fitting.

Figure 1

Figure 2

IMPORTANT: NOTE FIN DIRECTION & BAFFLE ASSEMBLY

SIDE VIEW

END VIEW

CROSS SECTION WITH BAFFLE



LD Series

Electrical Requirements

- ◆ 120 Volt - 60 HZ
- ◆ Starting Current 4.8 Amps
- ◆ Running Current 1.1 Amps

Gas Requirements

- ◆ Manifold Pressure
 - Nat. 3.5" • LP. 10.0"
- ◆ Minimum Inlet Pressure
 - Nat. 5.0" • LP. 11.0"
- ◆ Maximum Inlet
 - Nat. 14.0" • LP. 14.0"

Ventilation Requirements

- ◆ Residential models must be vented.
- ◆ Consult the general manual for venting instructions and unvented operation.
- ◆ For unvented operation (commercial use only), there must be a positive air displacement of at least 4.0 CFM per 1000 BTU/H for natural gas or 4.5 CFM per 1000 BTU/H for LP gas. WVE-4 termination cap must also be used.
- ◆ Maximum vent length for all models is 20 ft.

Approved & Required Vent Caps

Sidewall Single

- ◆ 3" Duravent sidewall vent kit (3-DSK).
- ◆ 3" Vent terminal (SWD-3).

Sidewall Dual (Sharing common t-stat)

- ◆ 4" Duravent sidewall vent kit (4-DSK).
- ◆ 4" Vent terminal (SWD-4).

Roof Single

- ◆ Approved 3" rooftop raincap (RTVP-3).

Roof Dual (Sharing common t-stat)

- ◆ Approved 4" rooftop raincap (RTVP-4).

Important: Do not use sidewall caps for roof venting and do not use roof caps for sidewall venting.

Theory of Operation

Standby:

The Micro 60U24 control continually checks for internal faults, safety circuit integrity, and relay contact positioning.

Starting Circuit:

Upon a call for heat, the control will verify that the burner and exhaust safety pressure switches are in their proper position. The fan relay energizes the fan, an operational static pressure is achieved and the normally open burner pressure switch will close, initiating the ignition sequence. The glow-bar is powered and after 45 seconds the main gas valve opens. If flame is not established the heater will attempt to re-ignite for a total of three trials for ignition and then proceed to lockout.

Running Circuit:

After ignition the flame-rod monitors the main burner flame. If flame is lost, the control acts to close the gas valve within one second and begin a new trial for ignition sequence, identical to the start up sequence, is initiated. If proof is not established within 8.5 seconds, the unit will retry 2 additional ignition sequences and then proceed to hard lock-out. The control can be reset by interrupting the power source or at

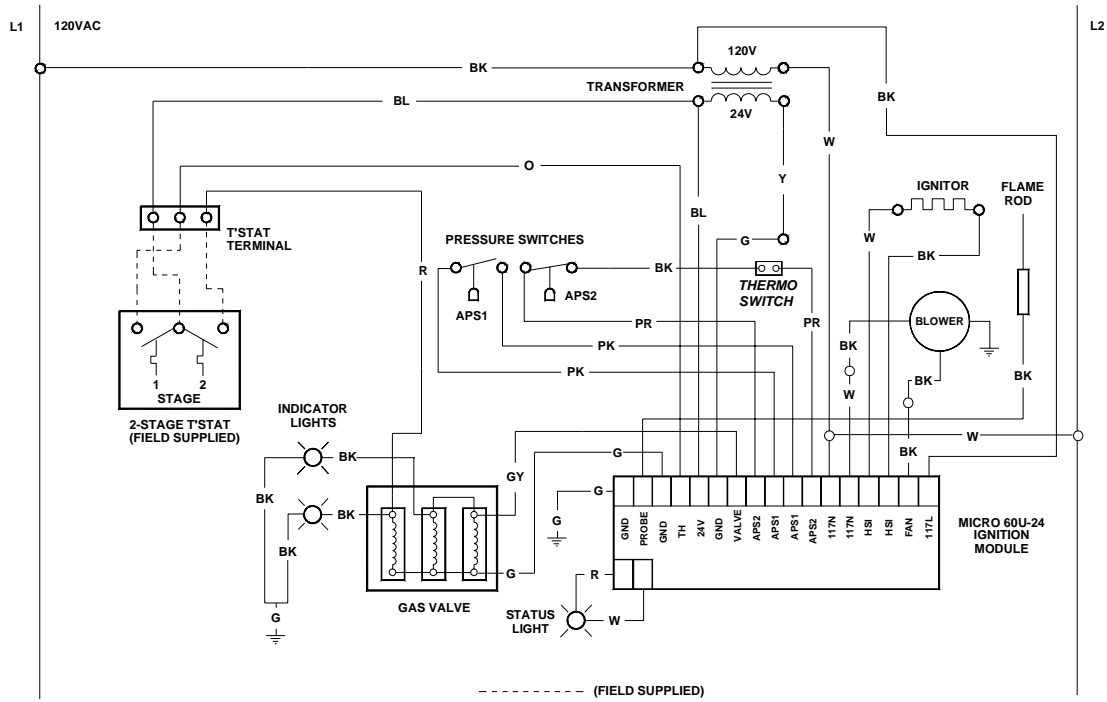
LED CODE	FAULT STATUS	FAULT CODE DELAY
Initial flash on power up, then steady off	Normal operation	Immediate
Steady on	Module failure / Internal fault	Immediate
1 flash	Ignition failure	30-32 minutes
2 flashes	APS 1 failure	10-12 minutes
3 flashes	ASP 2 failure	20-22 minutes
4 flashes	Solenoid valve fault / Leaky valve / Flame amplifier fault	Immediate
No flash on 117V start up	Transformer fault	Immediate

Note: Hard lockout LED code will appear upon completion of the soft lockout sequence of operation.

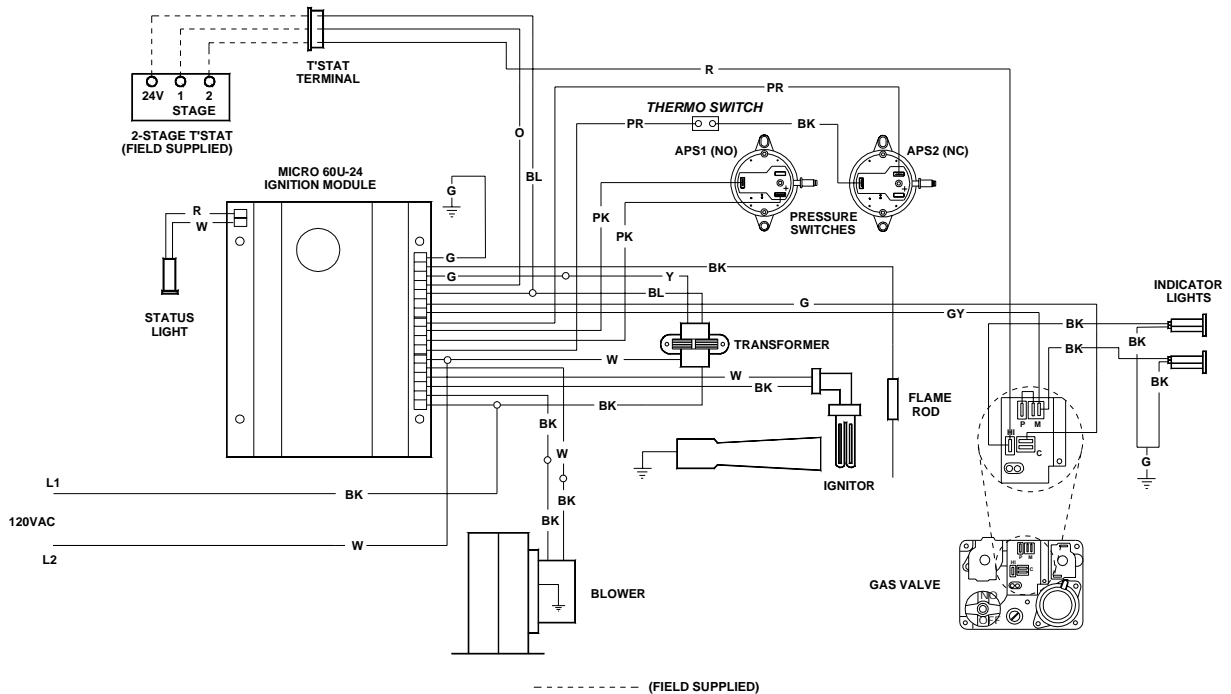
Internal Wiring Diagrams

MICRO 60U-24 WITH THERMO SWITCH

MICRO 60U-24 LADDER DIAGRAM

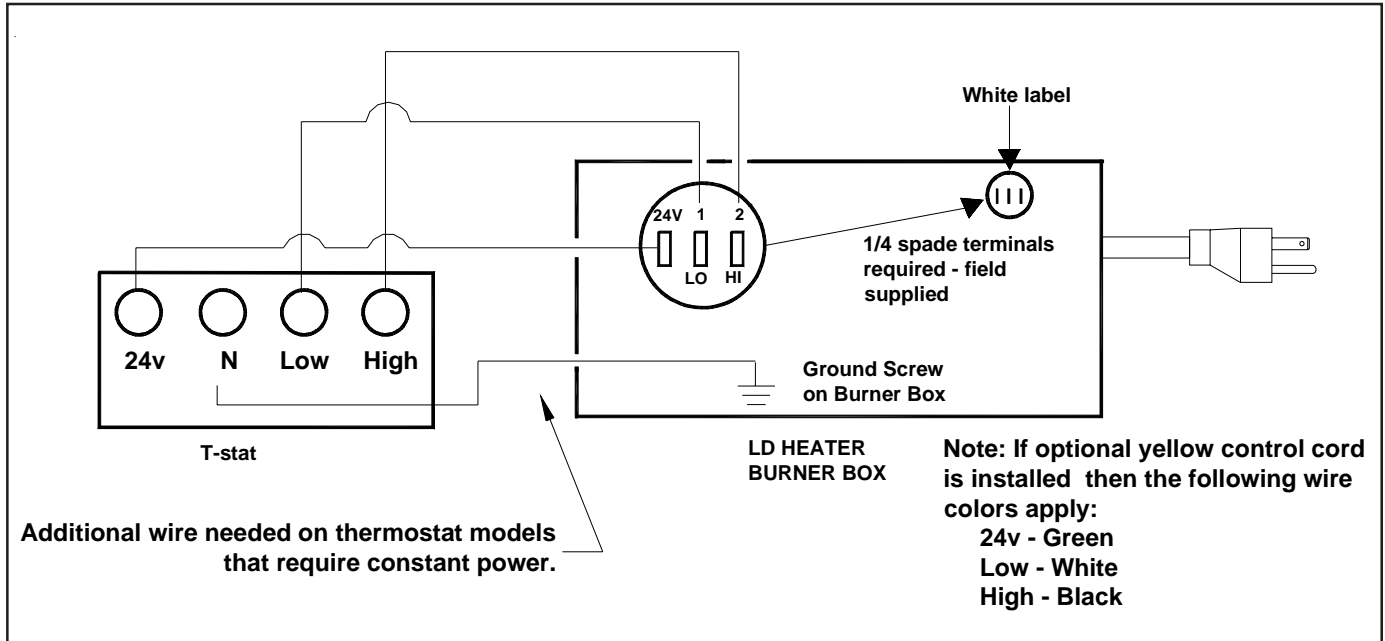


MICRO 60U-24 BLOCK DIAGRAM

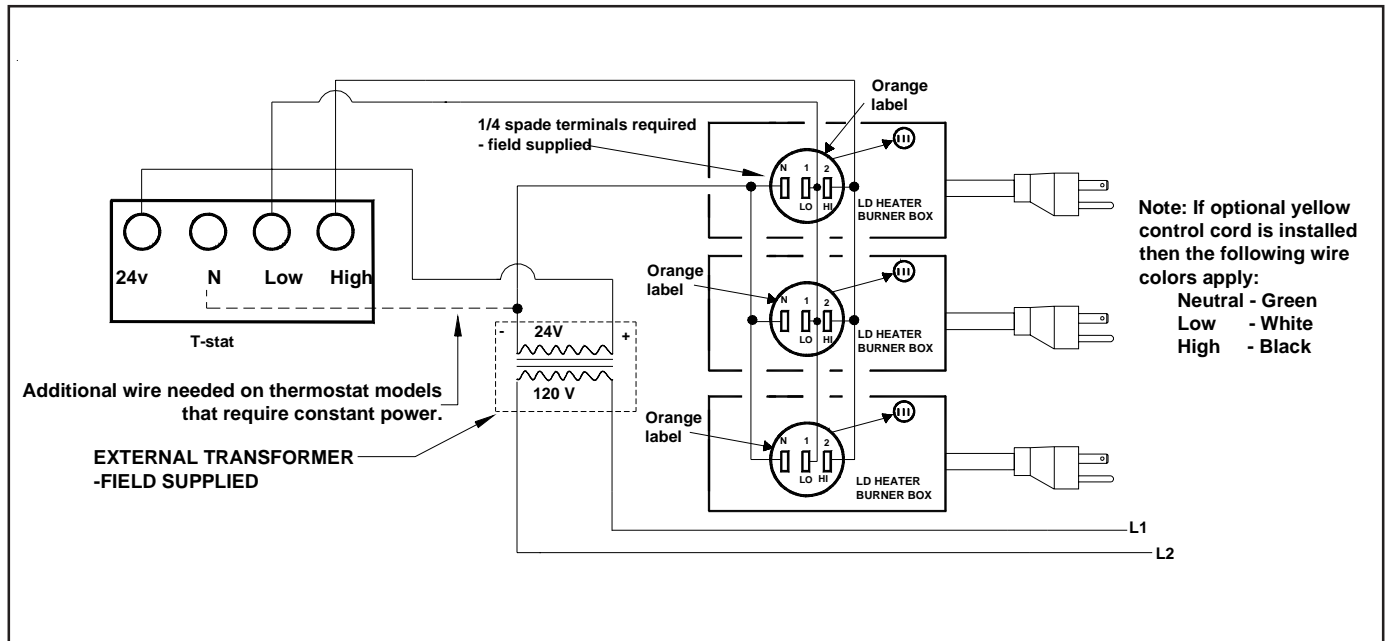


LD Series

Field Wiring Diagrams



Single heater, single thermostat, no relay board (white label).

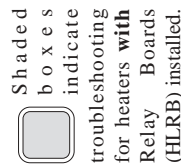


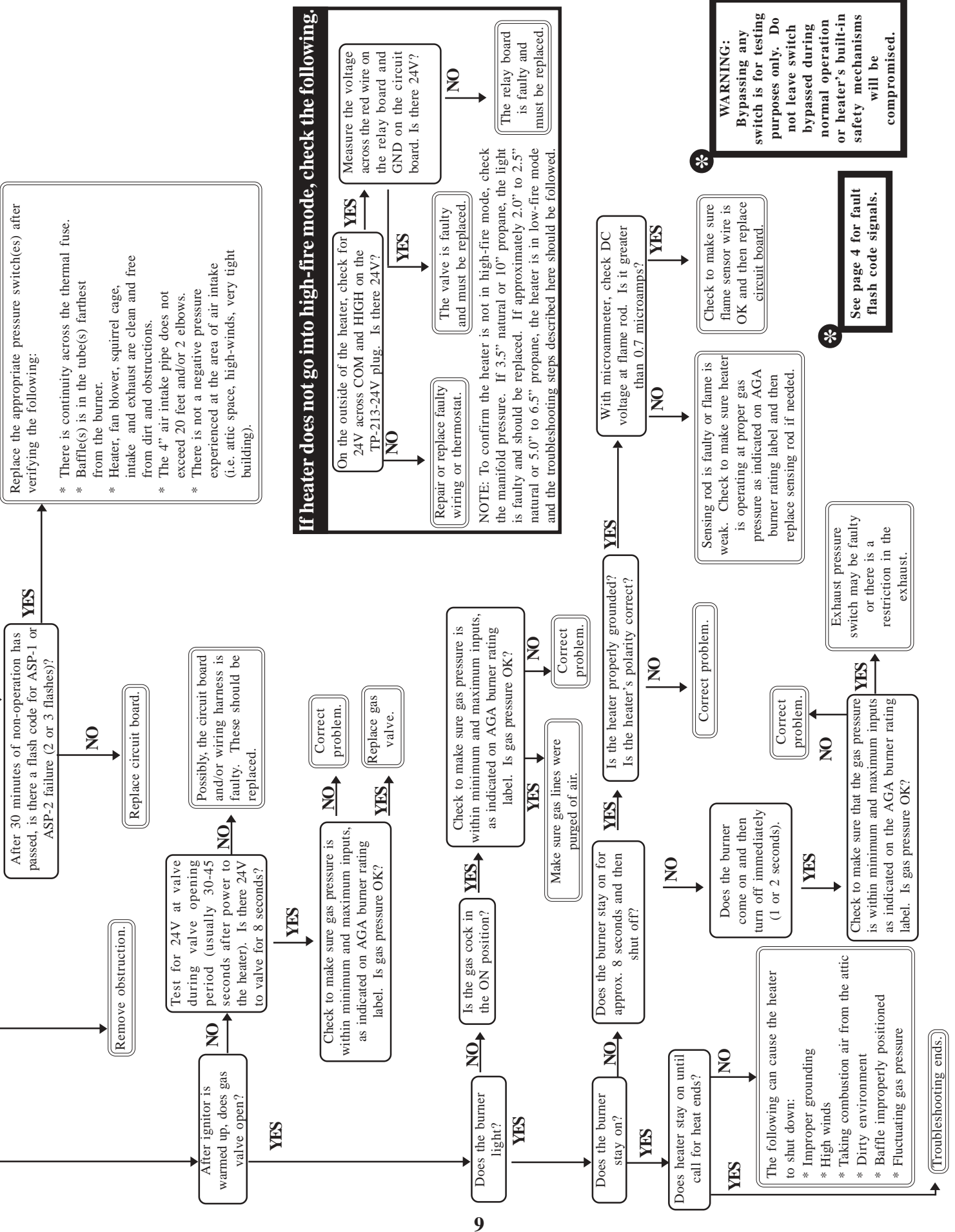
Multiple heaters, single thermostat, with HLRB (relay board - orange label).

MICRO 60U-24

MICRO 60U-24 LADDER DIAGRAM - WITH RELAY BOARD









Basic Parts List

LD SERIES PARTS LISTING

TP#	ITEM	TP#	ITEM
TP-1	CONTROL BOX COVER	TP-223	GAS MANIFOLD
TP-5	FLANGE GASKET	TP-264F	N.O. BURNER PRESS. SWITCH IS22035051F5132 (40 MBH)
TP-9	CONDUIT COUPLING	TP-333	3" BLACK 120V PLUG
TP-10	CONDUIT 4" X 1/2"	TP-334	YELLOW 24V CONTROL WIRE
TP-11	GLO-BAR IGNITOR BOX	TP-825	HLRB RELAY BOARD
TP-12	GLO-BAR IGNITOR BOX COVER	TP-826	40VA TRANSFORMER
TP-17	SIGHT GLASS KIT	TP-827	RED LED DISPLY DIAGNOSTIC LIGHT
TP-20C	120" ALUMINUM REFLECTOR	TP-828	YELLOW OPERATIONAL IND. LIGHT
TP-31B	CONTROL BOX BRACKET	TP-830	DIVIDER GROMMET
TP-33B	1/2" GAS COCK	TP-831	GREEN SELF TAP GROUND SCREW
TP-44	AIR ORIFICE W/SCREEN - CONSULT FACTORY	TP-832	THERMOSTAT TERMINAL STRIP
TP-50	GLO-BAR IGNITOR	TP-840	36E96-224 TWO STAGE GAS VALVE - NAT
TP-55A	FAN BLOWER (40, 50 MBTU/H)	TP-841	36E96-226 TWO STAGE GAS VALVE - LP
TP-56C	1/4" ATMOSPHERIC TUBE (VINYL)	TP-851	MICRO-60-24 DIAGNOSTIC CIRCUIT BOARD
TP-57A	1/4" PRESSURE TUBE	TP-852	WIRE HARNESS SET (3PCS.) FOR MICRO 60 BOARD
TP-68A	STRAIN RELIEF BUSHING	TP-1033	THERMAL FUSE
TP-70	CONTROL BOX COVER GASKET (PER FOOT**)	TP-1060F	N.C. EXHT PRESS. SWITCH IS22113062F5128 (40, 50 MBH)
TP-76	RUBBER GROMMET	TP-1064B	N.O. BURNER PRESS. SWITCH IS22052051F5174 (50 MBH)
TP-83	STAINLESS STEEL FLEX CONNECTOR	TP-1070	BURNER (40 TO 50 MBTU/H)
TP-105	REFLECTOR END CAP	TP-1078	REFLECTOR CENTER SUPPORT
TP-106	REFLECTOR CLIP	TP-1077	TUBE CLAMP
TP-112	5" REFLECTOR	TP-1079	WIRE HANGER W/ SPRING CLIP
TP-122	GASKET FOR AIR ORIFICE & AIR COLLAR	TP-1080	16" BURNER TUBE WITH FLANGE - 3" SPECIAL
TP-204	GAS ORIFICE - CONSULT FACTORY	TP-1081	10 FT.- 3" TITANIUM COMBUSTION TUBE
TP-205	GLO-BAR HOLDER	TP-1082	10 FT.- 3" COATED ALUMINIZED RADIANT TUBE
TP-208	"Z" MOUNTING BRACKET	TP-1083	3" S.S. INTERLOCKING 33" PRESSURE BAFFLE W/ TABS
TP-212	1/2" X 3" PIPE NIPPLE	TP-1086	3" S.S. INTERLOCKING 33" HEAT BAFFLE SECTION
TP-217	PRESSURE BARB FITTING	TP-1101	DIVIDER PANEL W/ P.S. MOUNTING TABS
TP-218	EXHAUST PRESSURE TUBE (VINYL)	TP-1102	LEFT END PANEL W/ LIGHT HOLES
TP-221	GLO-BAR HOLDER GASKET	TP-1103	RIGHT END PANELS - NO HOLES
TP-222	FLAME ROD	TP-1104	CONTROL BOX
TP-222A	FLAME ROD WIRE		

** 6' TOTAL NEEDED TO COVER OUTER EDGES OF A BURNER BOX (TP-70).



KIT CONTENTS AND PRODUCT FEATURES

Kit contents for the LD Series are shown below. Reference the proper column for your particular models length.

FILLED BY:		LD SERIES KIT CONTENTS			
TP#	DESCRIPTION	10 FOOT	15 FOOT	20 FOOT	30 FOOT
TP-1077	3" TUBE CLAMPS	1	2	2	3
TP-1079	3" HANGERS	2	3	3	4
TP-1078	3" REFL. CNTR. SPRT.	1	1	2	3
TP-105	REFL. ENDCAPS	2	2	2	2
TP-106	REFL. ENDCAP CLIPS	8	8	8	8
TP-33B	1/2" GAS COCK	1	1	1	1
TP-83	24" SS FLEX LINE	1	1	1	1
IOM	INSTALL / OP MANUAL	1	1	1	1



3" Reflector Center Support
TP-1078



24" SS
Flex
Connect
TP-83



3" Hanger
TP-1079



3" Butt Clamp
TP-1077



1/2" Gas Cock
TP-33B



Reflector End Caps
TP-105



Bag of Reflector
endcap clips
TP-106



General IOM
(LIOGT)
AND
LD Series
Insert
(LIOLD)

Product Features

APPROVALS

- IAS, CGA, CSA,
- Certain models are residentially certified to CSA No. 7-89.
- Outdoor Approval with OD-KIT.

BURNER SIGHT GLASS

- For burner inspection.

COMBUSTION AIR INLET & VENT

- 4" Air inlet duct.
- 3" Vent duct.

ENAMELED CONTROL BOX

- Outside air collar (4") attached.
- Totally enclosed components.

GAS CONNECTION

- 1/2" gas cock attached.
- 24" x 1/2" flex connector provided.

CONTROLS

- 100% safety shut off.
- Dual differential pressure switches.
- Silicon carbide hot surface igniter.
- Flame rod sensing.
- Pre and post purge controls.

EMMITER & COMBUSTION TUBES

- 16ga. 3" O.D. titanium coated combustion chamber.
- 16ga. 3" O.D. aluminized steel radiant tubes.

OPTIONAL FEATURES

- HLRB required when placing two or more heaters on a single control. Provide 24VAC from field.

RADIANT SURFACE AREA (SQ. FT.)

- 10' models - 7.6
- 20' models - 15.2
- 30' models - 22.8

WARRANTY*

- 1 year - Burner box components.
- 3 years-Combustion and radiant tubes.
- 5 years-Stainless steel burner.

*See cover for warranty registration information.

OTHER

- One reflector center support per reflector.
- Stainless steel turbulator baffle included.
- Stainless steel upgrades (burner box and reflectors only) are available.
- Silicone sealed control box available.
- Made in U.S.A.
- Visit www.reverberray.com for additional information.